

# **Tips on Writing Position Descriptions**

**For Non-Supervisory Engineering Positions at the  
GS-13, GS-14 and GS-15 Level**

**Human Resources Office  
George C. Marshall Space Flight Center**

## **Writing Position Descriptions**

A civil service job description is much more than a list of duties and responsibilities. The title and pay grade of positions in the federal service are determined by evaluating those duties and responsibilities using classification standards and grade evaluation guides developed by the U.S. Office of Personnel Management (OPM). It is, therefore, important, not only to describe the duties and responsibilities as accurately as possible, but also, to describe them in a manner that facilitates the application of the OPM classification standards.

## **Format**

All NASA position descriptions are written using OPM's Factor Evaluation System (FES) format. The FES format consists of a list of the duties of the position followed by nine standard paragraphs describing specific attributes (called factors) of the position. Most federal positions are now covered by classification standards that are written for the FES format.

Not every position can be classified using FES standards, however. Engineering and physical science positions concerned with hardware development, (and that includes most engineering positions at the Marshall Space Flight Center) are classified using OPM's Equipment Development Grade-Evaluation Guide. The Equipment Development Grade-Evaluation Guide was published prior to the development of the FES system and uses only two factors for determining the proper grade of an engineering position. The two factors used are: (1) Assignment Characteristics; and (2) Level of Responsibility. Neither factor is completely described in any of the standard FES paragraphs, which adds to the difficulty of classifying these positions and to the difficulty of writing position descriptions for them.

In order to assist you in writing job descriptions for engineering positions at the GS-13, GS-14, and GS-15 level we have highlighted, paragraph by paragraph, words and phrases that describe the assignment characteristics and level of responsibility that are typical of engineering positions at each level. We have also provided sample position descriptions for each grade level which are illustrative of duties typically performed by GS-13, GS-14, and GS-15 engineers at the Marshall Space Flight Center. We hope this material will be helpful to you in writing position descriptions for engineering jobs at these grade levels.

## Duties:

- GS-13 Non-supervisory engineers at the GS-13 level routinely function as **TECHNICAL SPECIALISTS** or **ENGINEERING SPECIALISTS** in an assigned area of responsibility (e.g., subject matter, function, or type of hardware). The duties of a GS-13 level engineer normally involve **INITIATING, COORDINATING** or **CONTROLLING** design and development efforts. Engineers at this grade level are expected to **CONCEIVE** and **DEVELOP** new theories, or approaches, and often work at **ESTABLISHING REQUIREMENTS FOR ADVANCED WORK** in their areas of responsibility.
- GS-14 At the GS-14 level, non-supervisory engineers typically function as **ADVISORS** or **EXPERT ADVISORS** and often double as **TEAM LEADERS**. GS-14 level engineers work in areas that **ADVANCE THE STATE-OF-THE-ART**. GS-14 level engineers frequently **PROVIDE LEADERSHIP** to technical specialists involved in research, design, production, planning, or operational activities. GS-14 level engineering assignments typically involve **ASSESSING** and/or **DEMONSTRATING THE EFFECTIVENESS** of new concepts, ideas or designs. GS-14 engineers are frequently involved in **EVALUATING TECHNOLOGICAL TRENDS**, or **SERVING ON SPECIAL AGENCY AND INTERAGENCY COMMITTEES** and **COORDINATING GROUPS**. The duties of a GS-14 level engineer characteristically include **CHAIRING SYMPOSIA** and other **IMPORTANT TECHNICAL MEETINGS**. GS-14 level typically devote the bulk of their time to **GUIDING, PLANNING, ORGANIZING**, and **DIRECTING** development efforts.
- GS-15 GS-15 level engineers act as **AUTHORITIES** and **CONSULTANTS**. They **PROVIDE OVERALL LEADERSHIP** and **DIRECTION** to technical specialists doing **PIONEERING DEVELOPMENT** work (or doing it themselves). This usually involves creating systems that have **PREVIOUSLY UNATTAINABLE CHARACTERISTICS** or **PREVIOUSLY UNATTAINABLE CAPABILITIES**. The duties of GS-15 level engineers typically include **REPRESENTING THE AGENCY ON COMMITTEES AND IN MEETINGS AS A RECOGNIZED AUTHORITY** and provide authoritative advice **AT THE HIGHEST LEVELS OF MANAGEMENT**.

## Factor 1

### Knowledge Required by the Position:

GS-13 When you read a GS-13 level job description, keep in mind the fact that a GS-13 level engineer is considered to be functioning at a level *above the journeyman level*. At the GS-13 level the words: "**MASTERY OF THE CONCEPTS, PRINCIPLES, AND PRACTICES OF...**" the particular field of engineering the employee is working in should lead off this paragraph. This should normally be followed by: "**KNOWLEDGE AND SKILL SUFFICIENT TO...**" do whatever the primary function of the position happens to be. GS-13 level engineers should have **KNOWLEDGE OF STATE-OF-THE-ART DEVELOPMENTS IN** whatever type hardware they develop. GS-13 engineers should also have the **ABILITY TO APPLY THE LATEST DEVELOPMENTS IN SOLVING PROBLEMS NOT READILY TREATABLE BY ACCEPTED METHODS**. GS-13 level engineers are also expected to have **KNOWLEDGE OF or WORKING KNOWLEDGE OF RELATED ENGINEERING AND SCIENTIFIC DISCIPLINES INCLUDING...** followed by a list of those related fields.

GS-14 At the GS-14 level you can expect to see the same words and phrases used above to describe knowledge required by the position. However, the "knowledges" paragraph of a GS-14 level description should begin with something like: "**MASTERY OF ADVANCED ENGINEERING CONCEPTS IN THE AREA OF...**" the area that the engineer specializes in and "**KNOWLEDGE OF ADVANCED DEVELOPMENTS AND TECHNIQUES IN...**" the type of hardware they develop.

GS-15 GS-15 level engineers need **A THOROUGH UNDERSTANDING OF THE MOST ADVANCED PRINCIPLES OF** the particular field of engineering they are working in, as well as everything else described above.

## Factor 2

### Supervisory Controls:

GS-13 At the GS-13 level, engineers typically receive their assignments in terms of **GENERAL OBJECTIVES** or **OVERALL OBJECTIVES**. They carry out their assignments **INDEPENDENTLY**, which means that they generally **RESOLVE TECHNICAL PROBLEMS** on their own without the involvement of the supervisor. GS-13 engineers are responsible for determining **METHODS USED AND APPROACHES TAKEN**. They **INTERPRET POLICY AND REGULATIONS** independently also. Since GS-13's are considered technical specialists, their **RECOMMENDATIONS ARE NORMALLY ACCEPTED AS THOSE OF A TECHNICAL SPECIALIST**. The technical recommendations of GS-13 level engineers are **LARGELY UNREVIEWED, EXCEPT WHERE**

**MATTERS OF POLICY, HIGHLY CONTROVERSIAL ISSUES OR UNPROVEN CONCEPTS** are involved. Their **DECISIONS ARE NOT NORMALLY REVIEWED IN DETAIL**, (at least not for technical adequacy) and their **COMPLETED WORK IS REVIEWED FOR FEASIBILITY IN RELATION TO REQUIREMENTS AND CONFORMANCE WITH POLICY AND PROGRAM OBJECTIVES**.

GS-14 At the GS-14 level engineers typically **WORK UNDER GENERAL ADMINISTRATIVE SUPERVISION**. They customarily report to a supervisor who **SETS THE OVERALL OBJECTIVES** and lets them know what **RESOURCES** are **AVAILABLE**. GS-14 level engineers normally function as technical experts, so their **RECOMMENDATIONS ARE NORMALLY ACCEPTED AS THOSE OF A TECHNICAL EXPERT**. They normally bring technical problems to their supervisors only when those problems have **BROAD PROGRAM IMPLICATIONS**. Completed work of GS-14 level engineers generally gets reviewed solely for **ATTAINMENT OF OBJECTIVES AND IMPACT ON MISSIONS AND PROGRAMS**.

GS-15 At the GS-15 level engineers are considered to be "authorities" on what they do. Decisions, recommendations and findings are considered to be **TECHNICALLY AUTHORITATIVE** and are **ACCEPTED WITHOUT SIGNIFICANT CHANGE**. Within the framework of **AGENCY POLICY, MISSION OBJECTIVES, AND TIME, STAFF, AND FUNDING LIMITATIONS**, they generally have the freedom to do what needs to be done. Completed work of GS-15 level engineers may be reviewed for **ADHERENCE TO POLICY** but is more generally evaluated only in terms of **FULLFILLMENT OF PROGRAM OBJECTIVES, IMPACT ON OVERALL AGENCY PROGRAMS** and, (in some cases), **CONTRIBUTION TO THE ADVANCEMENT OF TECHNOLOGY**.

### **Factor 3** **Guidelines:**

GS-13 At the GS-13 level engineers are guided by **AGENCY INSTRUCTIONS AND REGULATIONS**, and the **FUNDAMENTAL PRINCIPLES** of the engineering field in which they specialize. Engineers at the GS-13 level have to **EXERCISE JUDGEMENT** in order to solve **PROBLEMS OF A NOVEL OR CONTROVERSIAL NATURE**. They must exercise **A HIGH DEGREE OF INITIATIVE** in carrying out their assignments. In addition, they are typically required to **DEVELOP NEW INSTRUCTIONS AND PROCEDURES** or **NEW ENGINEERING CONCEPTS**.

- GS-14 At the GS-14 level engineers follow guidelines that include **REGULATIONS, POLICIES, AND BROAD TECHNICAL REFERENCES**. Engineers at this level have to use **CONSIDERABLE JUDGEMENT AND INGENUITY** when it comes to **INTERPRETING AND ADAPTING GUIDELINES THAT EXIST**. **GUIDELINES ARE FREQUENTLY UNAVAILABLE** for work performed by engineers at the GS-14 level.
- GS-15 At the GS-15 level engineers have relatively few guidelines. The same **AGENCY INSTRUCTIONS AND REGULATIONS** and the same **BROAD TECHNICAL REFERENCES** that are available to engineers for GS-13 and GS-14 level work are available. However, these references are **RARELY ADEQUATE FOR SOLVING COMPLEX AND UNIQUE PROBLEMS** encountered at the GS-15 level. Engineering work performed at the GS-15 level requires **A HIGH DEGREE OF ORIGINALITY AND TECHNICAL JUDGEMENT**. Assignments at this level often require the engineer to **DEVELOP TECHNIQUES AND PROCESSES** which are viewed as **TECHNICALLY AUTHORITATIVE**.

**Factor 4**  
**Complexity:**

- GS-13 Engineering assignments at the GS-13 level involve both a **BROAD RANGE** of activities and **HIGHLY SPECIALIZED ENGINEERING FUNCTIONS** in a particular engineering discipline. This requires **THEORETICAL EXPERTISE** in a particular engineering specialty and/or **EXTENSIVE APPLICATION OF THE THEORIES, PRINCIPLES AND PRACTICES** of one or more engineering disciplines. The engineering problems encountered by engineers working at the GS-13 level are often **NOVEL** or **CONTROVERSIAL** or (occasionally) **OBSCURE** and they require **INVESTIGATION AND EVALUATION OF VARIOUS ALTERNATIVE APPROACHES** or **EXTENSION OF EXISTING METHODS**, or **MODIFICATION AND EXTENSION OF STANDARD TECHNIQUES** and **DEVELOPMENT OF NEW APPROACHES**.
- GS-14 Engineers at the GS-14 level typically work on assignments which **ADVANCE THE STATE-OF-THE-ART**. They work on problems and programs that encompass **A VARIETY OF FUNCTIONAL AREAS** or **A VARIETY OF DISCIPLINES** or **A BROAD RANGE OF ENGINEERING SPECIALIZATIONS**. The **VARIETY OF COMPLEX FEATURES** that such difficult technical problems present typically require that GS-14 engineers **COORDINATE THE EFFORTS OF TECHNICAL**

**SPECIALISTS** representing a variety of specialized fields. The problems that GS-14 engineers customarily deal with are either **NOVEL AND COMPLEX** or **CRITICAL AND SEVERE**. Engineers working at the GS-14 level find that **ENGINEERING PRECEDENTS ARE LACKING IN AREAS CRITICAL TO THE DEVELOPMENT EFFORT** and therefore the engineer must devise **NEW CONCEPTS AND IDEAS**. They must also be **VERSATILE AND INNOVATIVE**, in order to **DEVELOP NEW APPROACHES** which will **ACHIEVE HIGHLY SIGNIFICANT ADVANCEMENTS** in the systems they are developing.

- GS-15 GS-15 engineers customarily work on the cutting edge of technology. GS-15 level assignments include responsibility to **INITIALLY EXPLORE AND EVALUATE THE FUNDAMENTAL VALUE OF TECHNOLOGY**. They work in areas where there is **LITTLE PRECEDENT OR GUIDANCE**. GS-15 level engineers work on problems of **EXCEPTIONAL IMPORTANCE** that have **FAR-REACHING CONSEQUENCES** and typically involve **A VARIETY OF EXCEPTIONALLY DIFFICULT AND COMPLEX FACTORS**. In order to carry out such assignments GS-15 level engineers must **ESTABLISH THE FEASIBILITY OF NEW CONCEPTS** in order to **ACHIEVE ADVANCEMENTS BEYOND THE CURRENT STATE OF THE ART**.

## Factor 5

### Scope and Effect

- GS-13 The "Scope and Effect" paragraph of any position description should always begin with: "The purpose of the work is..." At the GS-13 level the purpose of the engineer's work commonly involves such things as **DESIGNING AND DEVELOPING** something or **COORDINATING THE DESIGN AND DEVELOPMENT** of something or providing **EXPERTISE IN THE DESIGN, DEVELOPMENT, MODIFICATION, IMPROVEMENT, MAINTENANCE** or **OPERATION** of something. The purpose of the work may also be to **PLAN, ORGANIZE, CONTROL, COORDINATE**, or **REVIEW** work done by other technical specialists. Even when the engineer does not actually supervise, he or she may **GUIDE AND COORDINATE THE WORK OF OTHER ENGINEERS**. The actions of GS-13 level engineers **AFFECT THE WORK OF OTHER SUBJECT MATTER SPECIALISTS** and are almost certain to impact the **SAFETY, ECONOMY, EFFICIENCY**, and/or **EFFECTIVENESS** of the systems they are working to develop.
- GS-14 The purpose of the work of GS-14 level engineers often involves **PLANNING, ORGANIZING**, or (in the case of team leaders)

**DIRECTING DEVELOPMENT EFFORTS.** Since GS-14 level engineers are considered "technical experts", they typically **PROVIDE EXPERT ADVICE** to other engineers, subject matter specialists, and management officials regarding such things as the **FEASIBILITY OF PROCESSES** or **SYSTEMS**, or the **EFFECTIVENESS OF NEW CONCEPTS AND IDEAS**. The work of GS-14 level engineers often impacts the **RESOLUTION OF COMPLEX PROBLEMS OF CRITICAL IMPORTANCE** to a development effort. The efforts of engineers at the GS-14 level should result in **IMPROVEMENTS IN SYSTEM PERFORMANCE, EFFECTIVENESS, ECONOMY** and/or **SAFETY** of the systems they develop.

GS-15 The purpose of the work of GS-15 level engineers is to **PROVIDE OVERALL LEADERSHIP AND DIRECTION TO PIONEERING DEVELOPMENT EFFORTS**. They also **EVALUATE THE EFFECT OF SIGNIFICANT TECHNOLOGICAL CHANGES ON AGENCY POLICIES, OBJECTIVES, AND GOALS**. The purpose may also be to **SERVE AS AN AUTHORITY AND CONSULTANT** in a rapidly evolving technical field. The authoritative advice of GS-15 level engineers generally relates to such things as **MISSION AND PROGRAM OBJECTIVES AND REQUIREMENTS** or other **MATTERS OF EXCEPTIONAL IMPORTANCE OR OF FAR-REACHING CONSEQUENCE TO THE AGENCY**. The work of GS-15 level engineers influences **AGENCY PROGRAMS AND THE WORK OF ENGINEERS AND TECHNICAL SPECIALISTS WITHIN AND OUTSIDE THE AGENCY**.

## Factor 6 Personal Contacts

GS-13 At the GS-13 level, engineers confer with **OTHER ENGINEERS, SCIENTISTS, AND USER ORGANIZATIONS WITHIN THE CENTER**. They also have contacts with **TECHNICAL SPECIALISTS AT NASA HEADQUARTERS AND AT OTHER NASA CENTERS**. They also deal routinely with individuals and groups in the private sector including **REPRESENTATIVES OF VENDORS, SUPPLIERS, CONTRACTORS, INCLUDING ENGINEERING AND MANAGEMENT PERSONNEL**. GS-13 level engineers attend technical symposia and other technical meetings where they have contact with **RESEARCHERS, AND OTHER ACADEMIC SPECIALISTS**.

GS-14 GS-14 level engineers have **EXTENSIVE CONTACTS WITH KEY OFFICIALS AND ENGINEERS OF OTHER GROUPS (WITHIN THE AGENCY, OTHER GOVERNMENT AGENCIES, INDUSTRY,**



**UNIVERSITIES, AND RESEARCH ORGANIZATIONS).** Engineers at the GS-14 level participants in meetings **AS TECHNICAL EXPERTS** in their area of responsibility.

- GS-15 GS-15 level engineers have contacts with **HIGH LEVEL OFFICIALS WITHIN THE AGENCY** and with **HIGH RANKING OFFICIALS OUTSIDE THE ORGANIZATION INCLUDING SCIENTIFIC AND ENGINEERING PERSONNEL IN COMMERCIAL AND GOVERNMENT ORGANIZATIONS.** As recognized **TECHNICAL AUTHORITIES** they participate in **INTERAGENCY** or **NATIONAL MEETINGS OR CONFERENCES.**

## **Factor 7**

### **Purpose of Contacts**

- GS-13 At the GS-13 level contacts are for the purpose of **EXCHANGING INFORMATION, COORDINATING WORK EFFORTS AND PROVIDING TECHNICAL GUIDANCE TO ENGINEERS AND OTHER TECHNICAL SPECIALISTS.** They also provide technical expertise on matters within their area of responsibility to include **CONTROVERSIAL ISSUES.** During these contacts, GS-13 level engineers are often required to **INFLUENCE OR PERSUADE OTHER ENGINEERS TO ADOPT TECHNICAL POINTS ABOUT WHICH THERE IS DISAGREEMENT.**
- GS-14 At the GS-14 level contacts are for the purpose of **PROVIDING TECHNICAL EXPERTISE ON MATTERS WITHIN THE PROGRAM AREA.** GS-14 level engineers also **PARTICIPATE IN HIGH LEVEL CONFERENCES, NEGOTIATIONS, AND MEETINGS TO OBTAIN ACCEPTANCE OF NEW APPROACHES OR RESOLVE PROBLEMS AND ISSUES OF CONSIDERABLE CONSEQUENCE.**
- GS-15 At the GS-15 level contacts are to provide **EXPERT ADVICE AND CONSULTATION ON CRITICAL PROBLEMS.** Contacts are also for the purpose of **REVIEWING AND COORDINATING WORK** and **JUSTIFYING, DEFENDING, NEGOTIATING OR SETTLING HIGHLY CONTROVERSIAL OR SIGNIFICANT ENGINEERING ISSUES.** GS-15 engineers also **REPRESENT THE AGENCY AS A TECHNICAL AUTHORITY IN INTER-AGENCY PLANNING AND DECISION MAKING SESSIONS.**

## **Factor 8**

### **Physical Demands**

**Note:** Except in unusual circumstances the Physical Demands of the position will have no impact on the grade of engineering positions at the GS-13, GS-14, and the GS-15 level. It should be understood that this sample language is not meant to preclude a person with a handicapping condition relating to the ability to walk bend or climb from performing in an engineering position with reasonable accommodation.

GS-13, GS-14 and GS-15 The work is mostly **SEDENTARY**. Some **WALKING, BENDING, AND CLIMBING** may be associated with inspection visits to contractor facilities.

#### **Factor 9 Work Environment**

**Note:** Except in unusual circumstances the Work Environment of the position will have no impact on the grade of engineering positions at the GS-13, GS-14, and the GS-15 level.

GS-13, GS-14, and GS-15 The work is normally **PERFORMED IN AN OFFICE ENVIRONMENT** or a **LABORATORY ENVIRONMENT** with **SOME TRAVEL TO ATTEND MEETINGS OR TO REVIEW CONTRACTOR OPERATIONS**.

## **Sample Position Descriptions**

**For Engineering Positions at the GS-13, GS-14, and GS-15 level**

## **GS-13**

### *A. Major Duties*

Serves as a technical specialist for (name of organization) in the application of advanced theories, concepts, principles and processes of (discipline, function, type of system). The engineer is responsible for (type of activity, e.g., requirements definition, design, design analysis, analysis, development, fabrication, ground test, verification, qualification, flight test, etc.) of advanced (type of hardware) systems. In this capacity, the engineer has responsibility for providing expert advice and leadership for ad hoc groups of (engineers, and/or scientists and/or other technical specialists) in initiating, coordinating and controlling design and development of (system or type of system).

- Conducts studies and analyses to determine the feasibility of advanced engineering approaches and to define concepts and criteria for future programs. Conceives and develops new approaches and establishes requirements for advanced work in assigned area of responsibility.
- Guides and evaluates in-house and/or contractor efforts and assesses technical progress in relation to the established schedule and resources allotted. Reviews plans, specifications and cost estimates for technical adequacy. Reports progress and/or problems. Where deficiencies are noted, directs necessary changes, resolves controversial problems, assures conformance to plans and specifications, and furnishes other assistance as required.
- Conducts and/or directs special system analyses and trade studies directed toward meeting overall (type of system) objectives. Prepares engineering and support cost estimates to achieve the goals of project plans.
- Participates in reviews of solicited and unsolicited contractor proposals, contract specifications, and designs.
- Resolves problems or conflicts impeding progress, assuring that contractor and agency staffs work effectively toward timely completion of projects.
- Confers with representatives of industrial organizations on new materials, processes, or procedures applicable to the design and manufacture of (type of systems). Recommends the adoption of those that would enhance effectiveness, efficiency or economy.
- Prepares comprehensive technical reports reflecting the results of engineering studies and analyses. Prepares information for publication in technical journals or for discussion at technical conferences.

- Responsible for carrying out assigned duties and responsibilities in a manner consistent with the safety policies set forth by the supervisor. Reports existing or potentially hazardous situations and close calls to the supervisor and assists the supervisor in eliminating these conditions.
- In accordance with Public Law and NASA/MSFC Management Instructions, the incumbent is responsible for complying with the provisions of the Federal Technology Transfer Act of 1986.

## B. Factors

### 1. *Knowledge Required by the Position*

- Mastery of the concepts, principles and practices of (discipline) engineering.
- Knowledge and skill sufficient to serve as a (describe type of work, e.g., technical specialist, engineering researcher, etc.) in the development of (type of hardware) systems.
- Knowledge and skill sufficient to evaluate the most recent technological developments in (specialty area) and present analyses of technical options to higher level management.
- Knowledge of state-of-the-art developments in the design and development of (type of hardware) systems.
- Ability to apply the latest developments in solving problems not readily treated by accepted methods.
- Comprehensive knowledge of policies, laws, regulations, procedures and methods governing program/project functions.
- Working knowledge of related scientific and engineering disciplines including (list applicable related scientific/engineering fields, e.g., physics, chemistry, metallurgy, thermodynamics, electrical engineering, mechanical engineering, etc.).

### 2. *Supervisory Controls*

The supervisor assigns work in terms of overall objectives and areas of special interest. The engineer has wide latitude for independent judgment in obtaining objectives. Decisions are not normally reviewed in detail. The engineer is responsible for determining methods used and approaches taken. The

supervisor may be consulted on unusual problems for advice as to general policies that may be applicable, and may assist with administrative features including funds, personnel, priorities and procurement of equipment. However, the engineer is normally expected to interpret policy and regulations and resolve technical problems independently. The engineer provides advice independently but keeps supervisor informed of any major or controversial issues encountered. Recommendations are normally accepted as those of a technical specialist and are largely unreviewed except where matters of policy, highly controversial issues or unproven concepts are involved. Completed work is reviewed for feasibility in relation to requirements and conformance with policy and program objectives

### *3. Guidelines*

Guidelines include NASA and MSFC instructions and regulations as well as the fundamental principles of (discipline) engineering. The engineer must exercise judgment and originality in developing hypotheses, approaches, and new engineering concepts not previously tested or reported, in order to solve problems of a novel or controversial nature. The engineer must exercise a high degree of initiative in carrying out program/project functions. The engineer must exercise resourcefulness and sound engineering judgment in providing recommendations on solving problems of unusual design or controversy for which guidelines may require modification. In addition, the engineer may be required to develop instructions and other explanatory material to supplement Agency and Center guidelines. Supervisors and others usually recognize and accept the engineer's proposals for new or additional work as those of an authority in the (discipline) area.

### *4. Complexity*

Assignments involve a broad range of (discipline) engineering functions. The engineer is frequently confronted with novel or controversial technical problems that require the extension of existing methods and/or the development of new approaches. The engineer is responsible for advising on activities involving extensive application of the theories and principles of (discipline) engineering. Assignments typically involve investigation and evaluation of various alternative approaches and/or the extension of standard techniques. The engineer must anticipate and take action on problems that, if not resolved early, could lead to serious consequences from the standpoint of system safety, and performance reliability.

## 5. *Scope and Effect*

The purpose of the work is to (design and develop OR coordinate the design and development OR provide expertise in the design, development, modification, improvement, maintenance or operation [as applicable] of [type of hardware or system]). Technical findings and solutions to problems have direct and widespread effect on subsequent development or revision of design and operational criteria. The engineer serves as a technical expert on the limitation of proven concepts and practices of (discipline) engineering. Judgments made by the engineer may guide the work of other engineers and affect the work of subject matter specialists within the organization. Judgments made by the engineer may also involve taking positive action on problems which, if not identified in their early stages, could impact the safety, economy, efficiency or effectiveness of the systems being developed.

## 6. *Personal Contacts*

Contacts include other engineers, scientists, and user organizations within the Center. The engineer must also represent the organization in contacts with technical specialists at NASA Headquarters and at other Centers. Routine contacts include representatives of vendors, suppliers, and contractors including contractor engineering and management personnel. The engineer participates in various meetings, seminars, and conferences as an Agency representative. Contacts at such gatherings include researchers and other academic specialists.

## 7. *Purpose of Contacts*

Contacts are established for the purpose of exchanging information, coordinating work efforts and providing technical guidance to engineers and other technical specialists. Contacts involve negotiation and persuasion in obtaining the adoption of technical points and methods that are in conflict with the desires and opinions of other engineers. Contacts may involve controversial technical or programmatic issues that require tact, and diplomacy to convey accurate information concerning methods, techniques, or practices in the resolution of problems

## 8. *Physical Demands*

The work is sedentary. Some walking, bending and climbing may be necessary in connection with inspection visits to contractor facilities.

## 9. *Work Environment*

The work is normally performed in an office or laboratory setting. Some travel to attend meetings or review contractor operations may be required.



## **GS-14**

### *A. Major Duties*

Serves as lead engineer, technical advisor and expert for (name of organization). The engineer is responsible for accomplishing projects or assignments relating to ( discipline or specialty) as it relates to (project or general type of project). Provides leadership on an ad hoc/as needed basis to teams of engineers brought together for the purpose of developing solutions to broad and complex technical problems in the area of (discipline or specialty). This typically includes providing leadership and coordination in the planning, initiation and guidance of engineering analyses and studies and evaluating and critiquing completed studies and recommending future work. Such efforts typically involve coordinating the work of personnel, from within the Agency as well as from academic institutions and contractor organizations, with expertise in a variety of functional or discipline areas and require the application of the latest advances in scientific and engineering technology.

- Conceives, plans and conducts work in areas involving the implementation of technology where there are little or no previous experience factors for guidance. Has technical responsibility for continuation or abandonment of the work subject to approval of higher authority.
- Plans and coordinates the efforts of teams of engineers engaged in performing (discipline) engineering and technical direction for complex system development. Evaluates all contributions and integrates the recommendations of team members including the identification of critical technical problems and proposed solutions.
- Assesses the operational effects of technical decisions and advises laboratory/project management as appropriate.
- Conceives and develops new methods and techniques which can provide significant technical or operational impact in the assigned area. Advises on the best feasible approach to be taken for each assigned objective.
- Reviews technical literature and publications, evaluates technological reports and policy issues in the area of (function/discipline) and recommends policies to be formulated and implemented. Coordinates engineering policy matters with other offices.
- Reviews proposed programs and recommends appropriate systems and policies to be formulated and/or implemented. Develops and demonstrates the

effectiveness of new concepts and ideas for achieving particular mission goals or objectives.

- Provides expert advice in the evaluation of contractors' proposals, both solicited and unsolicited.
- Analyzes and evaluates complex projects or proposed policy issues; presents alternative policy choices and recommends management solutions based upon technological, scientific, cost and other considerations.
- Evaluates technological trends and identifies promising approaches for achieving significant advancements in operational and mission capabilities.
- Assesses and evaluates advanced proposals to satisfy program and mission objectives and to resolve unusually critical or severe problems. Develops proposed solutions to problems concerning (function/discipline) and recommends alternatives to be formulated and/or implemented.
- Prepares or directs development of comprehensive project reports to laboratory/project management. Prepares or directs development of feasibility studies, special reports and investigations on problems that have to do with (function/discipline).
- Reviews and assesses progress and resolves technical difficulties that can be overcome by changes in approach, criteria or requirements. Formulates design concepts and criteria that establish the baseline for advancement of the state-of-the-art engineering developments. Seeks methods of overcoming actual and potential problems in applying (function/discipline) techniques to specific projects and recommends proposed solutions.
- Responsible for carrying out assigned duties and responsibilities in a manner consistent with the safety policies set forth by the supervisor. Reports existing or potentially hazardous situations and close calls to the supervisor and assists the supervisor in eliminating these conditions.
- In accordance with Public Law and NASA/MSFC Management Instructions, the incumbent is responsible for complying with the provisions of the Federal Technology Transfer Act of 1986.

## B. Factors:

### 1. *Knowledge Required by the Position*

--Mastery of advanced concepts, principles and practices of (discipline) in order to investigate and provide expert advice to Center management regarding the design and development of (type of systems, e.g. propulsion systems, telemetry systems, structural systems, thermal systems, etc.).

--Ability to apply new developments to problems not readily treatable by accepted methods.

--Ability to apply new developments and experienced engineering judgment to solve a variety of highly complex technical problems.

--Knowledge of related engineering/scientific fields such as (related engineering or scientific disciplines, e.g. electrical engineering, structural engineering, chemical engineering, physics, astronomy, etc.) in order to evaluate projects from a broad perspective.

--Ability to resolve technical problems necessary to ensure the timely and successful completion of programs.

--Ability to communicate effectively, in the capacity of spokesperson for the Agency, in many areas of the engineer's expertise.

### 2. *Supervisory Controls*

The engineer independently plans and carries out project activities, resolves most conflicts that arise, and coordinates the work with experts in the laboratory, contractors, or others, as appropriate. Controversial or novel problems are discussed with supervisor. The engineer normally receives assignments in the form of overall objectives which he/she may translate into specific objectives and policies for others to follow. Technical aspects of the engineer's assignments are worked out individually or with teams of technical specialists and are normally final. Factors that have broad program implications, however, are called to the attention of the supervisor. The supervisor reviews actions of the engineer primarily for attainment of objectives and impact on mission and programs. Most recommendations to higher authority are considered as authoritative and are accepted without significant change.

### 3. *Guidelines*

Guidelines include project directives, overall program schedules, and Center and Laboratory directives. Other guidelines consist of professional manuals and publications in the field of (discipline), both domestic and foreign. The engineer must use judgment and ingenuity in interpreting available guidance and materials and exercise a high degree of initiative and judgment in devising and designing new theoretical approaches and procedures for solving problems, which are recognized as authoritative and are used in guiding others in the field.

### 4. *Complexity*

Assignments involve work in a variety of functional and discipline areas which are affected intensively by advances in scientific and engineering technology. The engineer is required to deal with technical problems for which engineering precedents are often lacking in ways that are critical to project development. The engineer must take actions and make decisions in solving highly complex technical problems. The work involves many areas of uncertainty requiring development of new techniques and criteria which may advance the state of the art. Coordination, evaluation, and integration of the activities of specialists working in related fields are required and technical compromises between competing approaches and requirements must be made in order to satisfy project and mission objectives.

### 5. *Scope and Effect*

The primary purposes of the work are to provide expert advice and guidance to Agency engineering personnel concerning unusual or critical problems, and to provide expertise and direction in planning and development. Work performed has a major impact on Agency programs and projects. The recommendations and decisions of the incumbent directly affect configuration, performance and operational requirements and determine whether systems function and perform their intended mission.

### 6. *Personal Contacts*

Personal contacts are with key officials and engineering personnel within the Agency, contractors, professional representatives of other agencies, manufacturers' representatives and other engineering experts in various fields from universities, research organizations, and elsewhere.

### *7. Purpose of Contacts*

Contacts are for the purpose of exchanging information, coordinating on projects, obtaining the cooperation and help of specialists in other organizations, discussing equipment requirements and, most importantly, rendering consultative services and discussing recommendations. Contacts are to resolve problems or issues of considerable consequence and cover a broad spectrum of professional interest. Assignments include participation in high level conferences, negotiations and meetings. The engineer contributes to the interaction between competing technical and cost constraints and assists in their resolution.

### *8. Physical Demands*

Work is normally sedentary. There are occasional visits to contractor or Government-owned facilities which require some walking and bending.

### *9. Work Environment*

Work is performed in an office/laboratory setting, except for occasional travel to attend meetings or visit contractor facilities.

**GS-15****A. Major Duties:**

Serves as the expert staff consultant responsible for a broad program involving planning, directing, and coordinating the work of scientists, engineers, and other technical specialists engaged in research, design, and development of (type of system) and associated ground test, development, and checkout equipment. Conceives, plans, and conducts pioneering work of outstanding scope, difficulty and complexity in unexplored or heretofore unpromising areas of investigation. The engineer serves as a nationally recognized expert in the development of (type of systems) and conceives, initiates and monitors policies, programs and projects dealing with the most challenging problems in the area of (discipline).

- Provides leadership and direction to pioneering research and development efforts leading to the manufacture of (type of systems) with previously unattainable capabilities. This includes exploring and evaluating new technology and identifying the most promising approaches for unprecedented development efforts. Responsibilities include evaluating new technology developments in a variety of fields to determine the feasibility and applicability of devices or ideas to missions assigned to the (name of organization).
- Plans, develops and directs cutting edge technology research and development involving the most advanced, (and often untried) concepts in the field of (discipline) in order to provide useful and reliable end products.
- Represents the Agency on committees and in meetings as a recognized authority in (discipline).
- As a recognized expert in (discipline) engineering, has authority to commit the organization to agreements and make final decisions, or participate with the (organization Chief or Director) in final decisions which have a direct effect on mission accomplishment, including the resolution of technical problems, development of project plans, agreement on design changes, and related activities.
- Coordinates the development interpretation and revision of policy and instructions affecting (type of system) development. Maintains close contact with NASA Headquarters elements in the advanced technology area.
- Serves as a recognized technical authority and expert advisor in the field of (discipline) providing advice at the highest levels of management.
- Confers with key government, contractor, and academic engineering experts in the field of (discipline), representing the Agency at technical symposia and

conferences. Develops authoritative papers and reports that further the objectives of the Center, publishing those which embrace new knowledge on subjects of far-reaching interest. Represents the Center and the Agency on boards, panels, and committees as a recognized expert in the area of (discipline) Participates as a presenter, (or attendee) in national and international seminars and symposia relating to (discipline or type of hardware).

- Serves on Laboratory and/or Center working groups and committees to develop plans and working agreements on matters involving interface problems and technical relationships with major contractors and subcontractors.
- Represents the Center in meetings with the cognizant office of NASA Headquarters and with the scientific and industrial communities.
- Initiates plans and recommendations on major projects being worked within the organization relating to allocation of resources, establishment of priorities, and identification of projects which are to be initiated, dropped, or curtailed.
- Presents and supports to the highest levels of management, proposals for pioneering research and development efforts.
- Participates in the planning of short-range and long-range activities, and the establishment, adjustment, and/or redefinition, (as necessary) of broad objectives for the organization.
- Establishes and implements measures for improving cost effectiveness without impairing overall operation of the organization.
- Leads special task force reviews and provides expert advice and consultation for the solution of critical problems in the design, development and testing of (type of hardware).
- Responsible for carrying out assigned duties and responsibilities in a manner consistent with the safety policies set forth by the supervisor. Reports existing or potentially hazardous situations and close calls to the supervisor and assists the supervisor in eliminating these conditions.
- In accordance with Public Law and NASA /MSFC Management instructions, the incumbent is responsible for complying with the provisions of the Federal Technology Transfer Act of 1986.

## B. Factors

### 1. *Knowledge required by the Position*

- Mastery of advanced theory, principles, techniques, and practices of (discipline)engineering including a thorough understanding of the most advanced principles of (discipline) as they apply to the development of space vehicles and associated ground support equipment.
- A detailed knowledge of the application of (type of hardware) design such as would be acquired through many years of experience in (discipline)design/development work on large scale, highly complex programs such as (name of highly complex program)
- Knowledge and skill necessary to function as a nationally recognized consultant and expert on state-of-the art (type of system) and in related ground support equipment.
- Knowledge of (discipline) engineering sufficient to apply new concepts, developments, and experienced judgment sufficient to solve a variety of highly complex technical problems.
- Skill to manage advanced research and development programs; to resolve any technical problems encountered; and to ensure the timely and successful completion of programs.
- Knowledge of and ability to apply fiscal, contracting, and administrative policies, procedures, and practices necessary to manage and determine the economic feasibility of major technical programs.
- Skill in applying new developments and experienced judgment to a variety of highly complex technical problems.
- Working knowledge of related fields such as (disciplines, e.g., electrical engineering, chemistry, physics, etc.) sufficient to evaluate (type of hardware) design and development projects from a broad perspective.

## 2. *Supervisory Controls*

The supervisor sets the overall objectives and resources available. Decisions, recommendations and findings of the engineer are considered technically authoritative and are accepted without significant change. The engineer and supervisor, in consultation, develop priorities and timetables for accomplishing work. The engineer plans and accomplishes work assignments within the framework of mission objectives, time, staff and funding limitations. The engineer coordinates the work of engineering experts working for contractors with other Agency expert engineers and interprets Agency policy for those experts as the need arises. The engineer keeps the supervisor informed of progress, potentially controversial matters, or far-reaching implications of the



work. The engineer is the principle advisor to and collaborator with the supervisor on issues involving (discipline). Completed work is generally reviewed for adherence to policy, fulfillment of program objectives and impact on overall Agency programs.

### 3. *Guidelines*

Guidelines include Agency regulations and policy, guide specifications, technical manuals, and standard practices. These guidelines are rarely adequate for solving the complex and unusual engineering problems with which the employee is faced, thus requiring the engineer to exercise considerable judgment and ingenuity in extending existing methods or developing new ones. A high degree of originality and technical judgment is exercised to complete assigned projects. Techniques and processes developed by the engineer are considered technically authoritative and are used for guiding others in the field.

### 4. *Complexity*

Assignments involve solving major problems in a broad range of activities and highly specialized (discipline) engineering functions. The engineer works in areas where little precedent or guidance is available. The engineer's responsibilities include initially exploring and evaluating new technology and establishing the feasibility of new concepts. The engineer must take actions and make decisions in solving highly complex technical and programmatic problems involving a variety of exceptionally difficult and complex factors. The work involves many areas of uncertainty requiring new developments to achieve advancements beyond the current state of the art. The engineer analyzes unique problems, and develops new and improved techniques and methods. Recommendations and conclusions are considered authoritative and typically have far-reaching consequences that effect the work and programs of extensive engineering activities. The engineer provides advice and guidance to Agency managers on matters of such difficulty that leading experts disagree as to the proper approach to or probable outcome of significant and far-reaching development efforts.

### 5. *Scope and Effect*

The purpose of the work is to provide expert advice and guidance to engineering personnel concerning unusual or critical problems, and to provide expertise and direction in the planning and development of new projects and programs. The engineer provides leadership and direction to pioneering development efforts involving matters of exceptional importance having far-reaching consequences to the Agency. The engineer evaluates the effect of significant technological

changes on Agency policies, mission objectives, requirements and goals. The work of the engineer influences Agency programs and the work of technical specialists within and outside the Agency.

#### *6. Personal Contacts*

Personal contacts are with high level officials within the Agency and with high ranking scientific and engineering personnel in commercial and government organizations. The engineer represents the Agency on interagency task forces and engineering councils. The engineer furnishes highly advanced technical guidance and information to top level administrative and technical Agency personnel, other government agencies, and outside organizations.

#### *7. Purpose of Contacts*

The purpose of contacts is to provide technical expertise on matters within the program area. Assignments also involve active participation in high level conferences, negotiations, and meetings, which have significant consequences in obtaining acceptance of new approaches to design, or otherwise considered of major importance. The engineer provides authoritative advice to the highest levels within the Agency concerning matters of fundamental significance in establishing objectives, program goals, and managing highly advanced important development programs. Contacts are also for the purpose of reviewing and coordinating work, justifying, defending, negotiating or settling highly controversial or significant engineering issues. The engineer serves on panels and committees concerned with planning Agency programs as an authoritative expert in the (discipline) area.

#### *8. Physical Demands*

The work is sedentary. Some walking, bending, and climbing may be necessary in connection with inspection visits to contractor facilities.

#### *9. Work Environment*

The work is normally performed in an office or laboratory environment with some travel to attend meetings or review contractor operations.